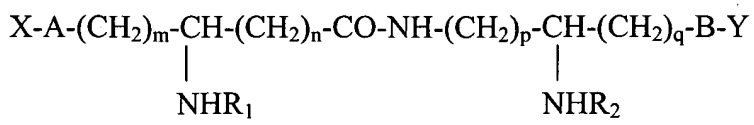
Listing of Claims

Please cancel all existing claims and replace them by the present claims in good order renumbered accordingly from 34 to 53

Claim 34 A N-acyl-dipeptidic compound of the formula



(I)

wherein R_1 and R_2 are each an acyl moiety of a saturated or unsaturated carboxylic acid of 2 to 24 carbon atoms unsubstituted or substituted with at least one member selected from the group consisting of hydroxyl, alkyl and alkoxy of 1 to 24 carbon atoms, amino, acyloxy of an organic carboxylic acid of 1 to 24 carbon atoms and acylamino and acylthio of a carboxylic acid of 1 to 24 carbon atoms and alkylthio of 1 to 24 carbon atoms, m, p and q are integers from 1 to 10, n is an integer from 0 to 10, X and Y are independently hydrogen or an acid group selected from the group consisting of

-carboxyalkyl[(C_{1-5})alkyl]

-CH-[$(CH_2)_{m1}$COOH][$(CH_2)_{n1}$COOH] with $m_1 = 0$ to 5 and $n_1 = 0$ to 5

-phosphonoalkyl[(C_{1-5})alkyl]

-dihydroxyphosphonyloxy[(C_{1-5})alkyl]

-dimethoxyphosphonyl

-phosphono

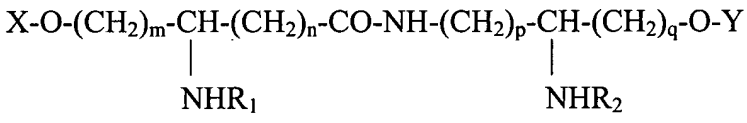
-hydroxysulfonyl

-hydroxysulfonyloxy[(C_{1-5})alkyl]

in neutral or charged form provided that at least one of the substituents X and Y is other than hydrogen and A and B are individually selected from the group consisting of oxygen, sulfur and –NH-.

Claim 35 A compound of claim 34 wherein at least one of X and Y is other than hydrogen in salt form with a non-toxic, pharmaceutically acceptable base.

Claim 36 A compound of claim 34 having the formula



(I')

wherein R_1 and R_2 are individually an acyl moiety derived from a saturated or unsaturated carboxylic acid of 2 to 24 carbon atoms, unsubstituted or substituted with at least one member selected from the group consisting of hydroxyl, alkyl and alkoxy of 1 to 24 carbon atoms, amino, acyloxy of an organic carboxylic acid of 2 to 24 carbon atoms and acylamino and acylthio of an organic carboxylic acid of 2 to 24 carbon atoms and alkylthio of 1 to 24 carbon atoms, m, p and q are individually integers from 1 to 10, n is an integer from 0 to 10 and X and Y are individually hydrogen or phosphono.

Claim 37 A compound of formula I of claim 34 containing elements having an (R) or (S) configuration , or racemates thereof.

Claim 38 A compound of claim 34 selected from the group consisting of 3-(3-dodecanoyloxytetradecanoylamino) 9-(3-hydroxytetradecanoylamino)-4-oxo-5-azadecan-1,10-diol, the 1-dihydrogenphosphate thereof and the 10-dihydrogenphosphate thereof, as well as the addition salts with an organic or a mineral base.

Claim 39 A compound of claim 34 selected from the group consisting of 3-(3-dodecanoyloxytetradecanoylamino)-9-(3-hydroxytetradecanoylamino)-4-oxo-5-azadecan-1,10-diol 1,10-bis-(dihydrogenphosphate) and its addition salts with an organic or a mineral base.

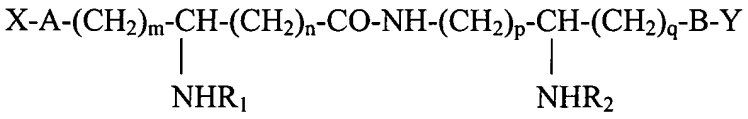
Claim 40 A compound of claim 34 selected from the group consisting of 3-(3-hydroxytetradecanoylamino)-9-(3-dodecanoyloxytetradecanoylamino)-4-oxo-5-azadecan-1, 10-diol, 1,10-bis-(dihydrogenphosphate) and its addition salts with an organic or a mineral base.

Claim 41 A compound of claim 34 selected from the group consisting of 3-(3-dodecanoyloxytetradecanoylamino) 9-(3-hydroxytetradecanoylamino)-4-oxo-5-azadecan-1,10-diol mono 1-dihydrogenphosphate and its addition salts with an organic or a mineral base.

Claim 42 A compound of claim 34 selected from the group consisting of 3-(3-hydroxytetradecanoylamino)-9-(3-dodecanoyloxytetradecanoylamino)-4-oxo-5-

azadecan-1,10-diol mono 1-dihydrogenphosphate and its addition salts with an organic or a mineral base.

Claim 43 The method for obtaining a dipeptide-like compound of formula I of claim 34



(I)

wherein R_1 and R_2 each are an acyl moiety derived from a saturated or unsaturated carboxylic acid of 2 to 24 carbon atoms which is unsubstituted or substituted with at least one substituent selected from the group consisting of hydroxyl, alkyl, alkoxy, acyloxy, amino, acylamino, acylthio and alkylthio,

wherein at least one of R_1 or R_2 is an acyloxyacyl

m, p and q are integers from 1 to 10,

n is an integer from 0 to 10,

X and Y each are hydrogen or an acid group selected from the group consisting of

-carboxy[(C_{1-5})alkyl]

-CH-[$(CH_2)_{m1}$COOH][$(CH_2)_{n1}$COOH] with m_1 = 0 to 5 and n_1 = 0 to 5

-phosphono[(C_{1-5})alkyl]

-dihydroxyphosphonyloxy[(C_{1-5})alkyl]

-dimethoxyphosphonyl

-hydroxysulfonyl

-hydroxysulfonyloxy[(C_{1-5})alkyl]

-phosphono

either in neutral or charged form,

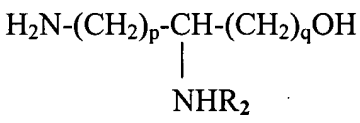
provided that at least one of X and Y is an acid group as specified above, either in neutral of charged form,

A and B have the meanings as specified above,

wherein the amine functional groups in position (q +1) ie. non terminal and in position ω ie. terminal of a diamino acid of formula $H_2N(CH_2)_pCHNH_2(CH_2)_{q+1}COOH$ are blocked by a blocking reagent which undergoes acidolysis and hydrogenolysis, respectively, the carboxylic functional group still in free form is reacted with a reducing agent to yield the corresponding alcohol, the non-terminal amine functional group is freed and then acyl-substitued with a carboxylic acid functional derivative of formula R_2OH

wherein R_2 is as defined above

the terminal amino functional group is subsequently freed by hydrogenolysis to yield a diamino alcohol of the formula



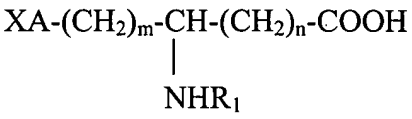
(II)

wherein R_2 is an acyl group derived from a saturated or unsaturated carboxylic acid of 2 to 24 carbon atoms, which is unsubstituted or substituted with at least one substituent as defined above,

p and q are integers from 1 to 10

said diamino alcohol is condensed in the presence of a peptide condensing agent in an inert solvent together with a carboxylic acid selected from the group

consisting of a ω-hydroxy-amino acid, a ω-amino-amino acid and a ω-thio-amino acid of the formula



(III)

wherein R_1 is an acyl group derived from a saturated or unsaturated carboxylic acid of 2 to 24 carbon atoms, which is unsubstituted or substituted with at least one substituent as defined above,

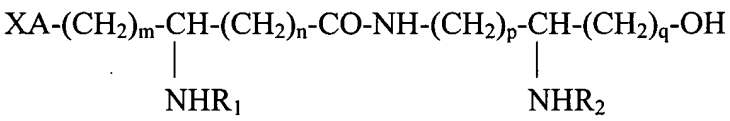
m is an integer from 1 to 10

n is an integer from 0 to 10

A is oxygen, sulfur or imino

and X is an acid radical as defined previously, which is optionally in an ester form

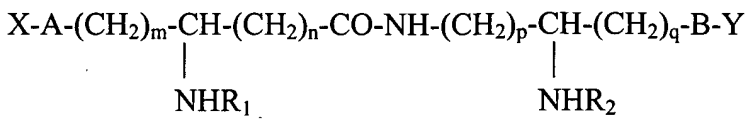
to yield a dipeptide-like compound of the formula



(IV)

wherein R_1, R_2, n, m, p, and q have the meanings as specified above,

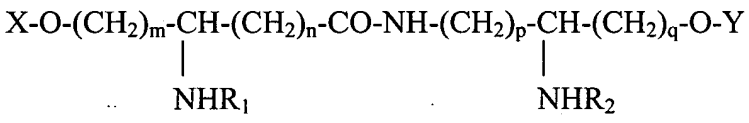
the alcohol functional group of which is alkylated or acylated of otherwise substituted by an alkylating or acylating or an otherwise substitution reagent, in the presence of a coupling agent, and subjected to a catalytic hydrogenation or some other deprotection method, to obtain a compound of the formula



(I)

wherein A, B, X, Y, R_1, R_2, n, m, p, and q have the same meanings as those given above.

Claim 44 A method for obtaining a phosphodipeptide-like compound of the formula I' in accordance with claim 36



(I')

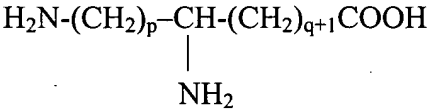
wherein R_1 and R_2 each are an acyl group derived from a saturated or unsaturated carboxylic acid of 2 to 24 carbon atoms which is unsubstituted or substituted by at least one substituent selected from the group consisting of hydroxyl, alkyl, alkoxy, acyloxy, amino, acylamino, acylthio, and alkylthio,

m, p and q are integers from 1 to 10,

n is an integer from 0 to 10

X and Y each are hydrogen or phosphono either in neutral or charged form,

wherein the amino functional groups in position (q+1) ie non-terminal and in position ω ie terminal of the diamino acid of formula



are blocked by blocking reagents which undergo acidolysis and hydrogenolysis, respectively, the carboxyl functional group in free form is reacted with a reducing agent to yield the corresponding alcohol, the non-terminal amine functional group is freed and then acyl-substituted by means of a carboxylic acid functional derivative of formula R_2-OH

wherein R_2 is as defined above

the terminal amino functional group is subsequently freed by hydrogenolysis to yield the amino-alcohol of the formula

$$H_2N\text{-}(CH_2)_p\text{-}\underset{\displaystyle NHR_2}{\underset{|}{CH}}\text{-}(CH_2)_qOH$$

(II)

wherein R_2 is an acyl group derived from a saturated or unsaturated carboxylic acid of 2 to 24 carbon atoms, which is unsubstituted or substituted by at least one substituent as specified above,

p and q are integers from 1 to 10

said amino-alcohol is condensed in the presence of a peptide condensing agent in an inert solvent together with a ω-hydroxy amino acid derivative of the formula

$$XO\text{-}(CH_2)_m\text{-}\underset{\displaystyle NHR_1}{\underset{|}{CH}}\text{-}(CH_2)_n\text{-}COOH$$

(III)

wherein R_1 is an acyl group derived from a saturated or unsaturated carboxylic acid of 2 to 24 carbon atoms, which is unsubstituted or substituted by at least one substituent as specified above,

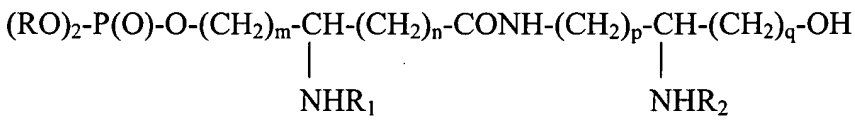
m is an integer from 1 to 10

n is an integer from 0 to 10

and X is a dialkyloxy- or diaryloxy-phosphoryl group of the formula

$(RO)_2P(O)$-

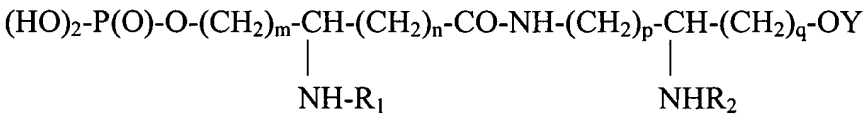
to yield the dipeptide-like compound of the formula



(IV')

wherein R_1, R_2, m, n, p and q are as defined above , and R is a group which undergoes hydrogenolysis or hydrolysis,

the alcohol functional group of which can be phosphorylated by a phosphorylating agent in the presence of a coupling agent, the resulting product is subjected to a two step catalytic hydrogenation to unblock the alcohol functional group optionally present on the acyl group R_2, the phosphate functional group and the second optionally present phosphate functional group to obtain a compound of the formula



wherein Y is either hydrogen or phosphono and R_1, R_2, m, n p and q have the above-given definitions.

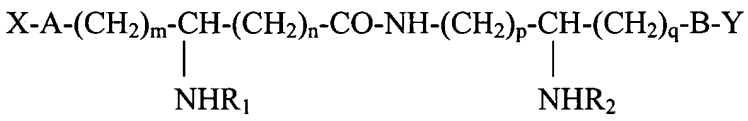
Claim 45 The process of claim 43 wherein the product of formula (I) is further reacted with an organic or mineral base to form the salt thereof.

Claim 46 The process of claim 45 wherein the salt formation step is carried out with a mineral or an organic base intended for therapeutic use

Claim 47 The process of claim 43 wherein R_1-OH is 3-dodecanoyloxytetradecanoic acid.

Claim 48 The process of claim 43 wherein R_2-OH is 3- hydroxytetradecanoic acid.

Claim 49 A pharmaceutical composition containing as an active ingredient at least one compound of the formula I in accordance with claim 34:



(I)

wherein R_1 and R_2 each being an acyl group derived from a saturated or unsaturated carboxylic acid of 2 to 24 carbon atoms, which is unsubstituted or substituted with at least one substituent selected from the group consisting of hydroxyl, alkyl, alkoxy, acyloxy, amino, acylamino, acylthio and alkylthio,

m, p and q are integers from 1 to 10,

n is an integer from 0 to 10,

X and Y each are hydrogen or an acid group either in neutral or charged form,

A and B are individually oxygen, sulfur or imino,

together or in admixture with a non-toxic, pharmaceutically acceptable, inert carrier.

Claim 50 The pharmaceutical composition in accordance with claim 49, wherein the compound of formula I is a compound of the type where X and/or Y are phosphono and further A and B are an oxygen atom.

Claim 51 The pharmaceutical composition in accordance with claim 49 , wherein the active ingredient is in salt form with an organic or mineral base intended for therapeutic use.

Claim 52 The pharmaceutical composition in accordance with claim 49, wherein the active ingredient is in the form of a pure enantiomer or in the form of a mixture of stereoisomers.

Claim 53 The method of inducing immuno-modulation in warm-blooded animals in need thereof comprising administering to said warm-blooded animals an immuno-modulating effective amount of a compound of claim 34.